

**Two New Species of *Jappa* from Australia
(Ephemeroptera: Leptophlebiidae)**

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Abstract.—Two new species of horned *Jappa*, *J. edmundsi* and *J. serrata* are described from North Queensland on the basis of larval characters. Comparisons are made with the only other known horned *Jappa*, *J. kutera* Harker. Illustrations of head characters and notes on biology are provided.

The burrowing mayfly genus *Jappa* was erected by Harker (1954) to hold *J. kutera* Harker (type species) and *J. tristis* Harker. The original description of the larvae of this genus (Harker, 1950) was based only on *J. kutera* in which the larvae possess frontal horns on the head that are superficially similar to the mandibular tusks present in most Ephemeroidea. Riek (1970) reports that there are 7 species of *Jappa*, of which several are without frontal horns. The two species originally assigned to the genus remain the only named species in the genus.

Two new species of *Jappa* bearing frontal horns are described herein; they were collected by the junior author in the Cape Tribulation area of northern Queensland. This extends the known range of the burrowing species with frontal horns, which were previously reported by Riek (1970) to occur from central Queensland to southern New South Wales. Numerous adults of *Jappa* were also taken by the junior author as far north as Cape York, but without associated larvae.

The descriptions and discussions below are based on larvae only, preserved in 80% ethanol. CL numbers following locality data refer to codes used by the junior author to reference ecological notes. Types are deposited in the Australian National Insect Collection, Canberra (ANIC).

***Jappa edmundsi*, NEW SPECIES**

Nymph.—Length: body 14.5 mm (including horns), caudal filaments 7.2 mm.

Head.—Frontal horns approximately 2× head capsule length, bifurcate into dorsal and ventral prongs, dorsal prongs small and divergent laterally, ventral prongs 4× longer than dorsal prongs and curving strongly toward each other (Fig. 1); two clumps of fine setae present basally on each horn to either side of dorsal surface, third setal clump present at median horn base on head dorsum; small protruberance present at base of each horn on dorsal surface; antennae long, bearing whorls of short setae at apex of each segment, setae 1–1.5× diameter of antennae.

¹ Reprint requests should be directed to the junior author.

Thorax.—Pronotum roughly quadrate, broader anteriorly, lateral margins explanate, bearing long pale setae; legs with femora, tibia and tarsi covered with very long fine pale setae; fore femur broad, flattened; fore tibia cylindrical, longer than femur.

Abdomen.—Abdominal terga 4–9 bearing many long fine setae; posterolateral spines on segments 8 and 9 small; 3 caudal filaments present posteriorly, bearing long pale setae.

Coloration.—Dorsum generally with brown markings on yellowish white background; venter pale, unmarked; dorsum of head light, area bordered by ocelli and frontal suture slightly darker, distinct dark brown markings present posterior to lateral ocelli and medial to eyes (Fig. 1); pronotum with laterally placed, longitudinal dark brown markings at same distance from midline as eyes; mesonotum with dark brown markings just lateral to midline; abdominal terga bearing distinct, paired brown longitudinal stripes on segments 1–7, segment 8 with longitudinal stripes closer to midline and faint, segments 9 and 10 unmarked.

Material examined.—Holotype, immature larva: AUSTRALIA, Queensland, Hutchinson Creek at Cape Tribulation road, north of Daintree Landing, CL 1733, VIII-17-83, D. A. and T. J. Polhemus (ANIC). Paratypes: 8 immatures, same data as types, 2 in ANIC, remainder in University of Utah.

Etymology.—The name “edmundsi” is in honor of George F. Edmunds, Jr.

Jappa serrata, NEW SPECIES

Nymph.—Length: body 10 mm (includes horns), caudal filaments 5.5 mm.

Head.—Frontal horns approximately $1 \times$ head capsule length; dorsal horn margins serrate distally (Fig. 3), serration number typically 4, excluding horn tip, occasionally 3 on smaller specimens; 2 clumps of fine setae present basally on each horn to either side of dorsal surface; small protruberance present between setal clumps on dorsal surface of horn base; antennae long, bearing whorls of long setae at apex of each segment, setae $2\text{--}2.5 \times$ antennal diameter.

Thorax.—Pronotum roughly quadrate, broader anteriorly, lateral margins explanate, bearing long pale setae; legs with femora, tibiae and tarsi covered with very long fine pale setae; fore femur broad, flattened; fore tibia cylindrical, longer than femur.

Abdomen.—Posterior halves of abdominal tergites bearing many long fine setae; posterolateral spines on segments 8 and 9 small; 3 caudal filaments present posteriorly, bearing long pale setae.

Coloration.—Dorsum generally with brown markings on yellowish white background; venter yellowish white with some dark brown markings on thorax; prosternum with two longitudinal dark brown markings medial to coxae on either side of midline, small horizontal dark brown marking on posterior aspect; mesosternum with two pairs of longitudinal dark brown markings, first pair anterior, larger and closer to midline, second pair posterior, just medial to coxae; head mostly light with darker area between ocelli, eyes, and posterior margin of head capsule; pronotum yellow, with four brown bilaterally arranged markings, lateral markings longer and darker than more medial ones; mesonotum yellow with distinct curving horizontal brown line near posterior margin, apex of curve oriented towards abdomen; metanotum yellow with irregular brown line near posterior margin; abdomen yellowish white, tergites 4–9 marked with single longi-

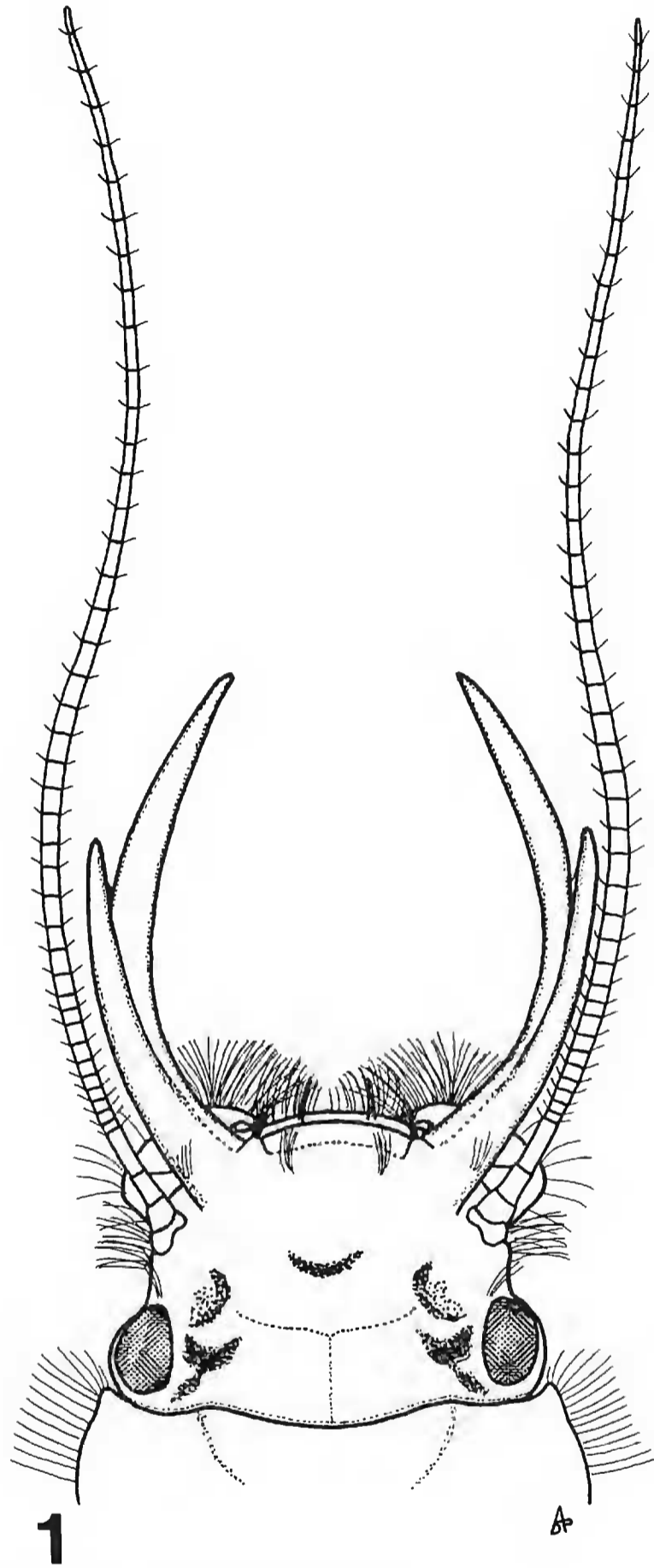
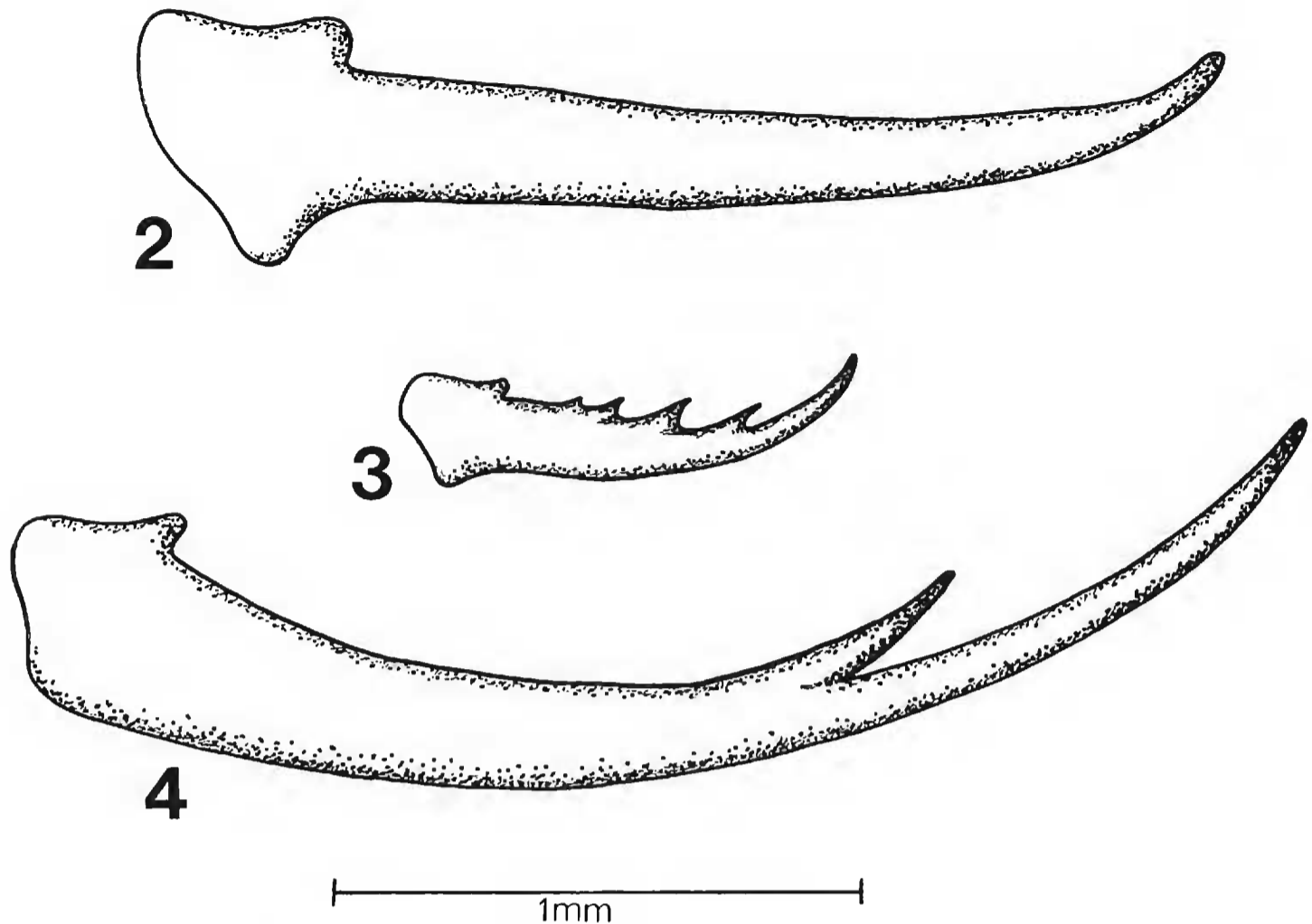


Figure 1. *Jappa edmundsi*, n. sp., dorsal view of head.

tudinal light brown stripe, stripe slightly divided on segment 8, inconspicuous on segment 9.

Material examined.—Holotype, immature larva: AUSTRALIA, Queensland, Hutchinson Creek at Cape Tribulation road, north of Daintree Landing, CL 1733, VIII-17-83, D. A. and T. J. Polhemus (ANIC). Paratypes: 4 immatures, same data as types, 1 in ANIC, 3 at University of Utah.



Figures 2–4. Frontal horns of *Jappa* spp., lateral view. 2. *J. kutera* Harker. 3. *J. serrata*, n. sp. 4. *J. edmundsi*, n. sp.

Etymology.—The name “serrata” refers to the distinctive frontal horns of this species.

DISCUSSION

J. edmundsi may be distinguished from the other known larvae of *Jappa* by the strongly bifurcate frontal horns (Figs. 1, 4). Additional distinctive features include the three fine setal clumps basally on the horns and adjacent head dorsum, the length of the setae on the antennae, the length of the front tibiae and the dorsal coloration.

J. serrata may be distinguished from the other known larvae of *Jappa* by the serrate dorsal margins of the frontal horns (Fig. 3). Additional distinctive features include the two fine setal clumps present basally on the horns, the length of the setae on the antennae and the dorsal coloration.

J. serrata and its sympatric congener *J. edmundsi* can also be distinguished from each other by size (*J. edmundsi* 7–12 mm and *J. serrata* 6–8 mm) and by the difference in horn versus head length. Because of the paucity of available specimens and the lack of mature nymphs, caution should be used when considering such characteristics as color for identification.

J. kutera Harker, the other known horned species of *Jappa*, differs from *J. edmundsi* and *J. serrata* by the frontal horns, which in *J. kutera* are without serrations or bifurcations (Fig. 2). These horns are generally 1–1.5× the head capsule length, with a small setal clump present on the dorsum of each horn tip. Setal clumps at the horn bases appear to be variable, with either 2 or 3 present

on the specimens examined. The setae on the antennae of *J. kutera* are also distinctive, with the basal $\frac{1}{4}$ of the antenna bearing long setae ($2-2.5 \times$ diameter of antenna) while the distal $\frac{3}{4}$ bears short setae ($1-1.5 \times$ diameter of antenna). The abdominal dorsum is usually more heavily setiferous than in the other species, with segments 3-9 bearing many long fine setae. Posterolateral spines on abdominal segments 8 and 9 are larger than in *J. edmundsi* and *J. serrata*. Dorsal coloration varies between different localities but in general differs from *J. edmundsi* and *J. serrata* in that the abdominal terga have paired brown markings that are larger than those in the preceding two species.

BIOLOGY

The type series of *J. edmundsi* and *J. serrata* were both taken at the same locality in the same section of Hutchinson Creek just upstream of the Cape Tribulation road crossing. Specimens were collected from a coarse sandy substrate overlain by a layer of heavy, black, rounded stones in swiftly flowing water approximately 0.6 meters deep. The stream at the type locality was heavily shaded by rain forest.

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LITERATURE CITED

- Harker, J. E. 1950. Australian Ephemeroptera. Part 1. Taxonomy of New South Wales species and evaluation of taxonomic characters. Proc. Linn. Soc. N.S.W., 75:1-34.
- . 1954. The Ephemeroptera of eastern Australia. Trans. R. Entomol. Soc. London, 105:241-268.
- Riek, E. F. 1970. Ephemeroptera. In CSIRO, The insects of Australia. Melbourne Univ. Press, Melbourne, 2079 pp.